

## FLIGHT SUMMARY REPORT

**Flight Number:** 97-007-02  
**Calendar/Julian Date:** 30 June 1997 • 181  
**Sensor Package:** Thermal Infrared Multispectral  
Scanner (TIMS)  
DoE Multispectral Scanner (MSS)  
**Area(s) Covered:** Oklahoma

**Investigator(s):** Schmugge, USDA

**Aircraft #:** 799  
Department of Energy  
Cessna Citation

### SENSOR DATA

<b>Accession #:</b>	----	----
<b>Sensor ID #:</b>	086	1268
<b>Sensor Type:</b>	TIMS	MSS
<b>Focal Length:</b>	----	----
<b>Film Type:</b>	----	----
<b>Filtration:</b>	----	----
<b>Spectral Band:</b>	----	----
<b>f Stop:</b>	----	----
<b>Shutter Speed:</b>	----	----
<b># of Frames:</b>	----	----
<b>% Overlap:</b>	----	----
<b>Quality:</b>	Good	Good
<b>Remarks:</b>		

## **Airborne Science and Applications Program**

The Airborne Science Branch at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

## **Department of Energy Remote Sensing Laboratory**

The NASA Airborne Science and Applications Program at Ames Research Center contracted with the Department of Energy Remote Sensing Laboratory (RSL) in Las Vegas, Nevada to fly the RSL Multispectral Scanner (MSS) and the NASA Thermal Infrared Multispectral Scanner (TIMS) over the desert southwest. The scanners were flown on the DOE Cessna Citation.

The Cessna Citation is a low and medium altitude, moderate speed aircraft. It can operate from 4,000 to 35,000 feet above sea level at speeds between 135 and 225 knots. There are two instrument ports in the aircraft. The RSL 1268 Multispectral Scanner was mounted over the aft port and the NASA Thermal Infrared Multispectral Scanner was mounted over the forward port.

## **RSL Daedalus 1268 MSS**

The DOE Multispectral Scanner simulates the spectral characteristics the Thematic Mapper (TM) multispectral scanners orbiting on Landsat 4 and Landsat 5. The seven TM bands are replicated with the MSS and four additional bands of discrete wavelengths are acquired. THE MSS acquires TM band six (thermal data) as two bands in low and high gain settings. The scanner is configured as follows:

<u>Daedalus Channel</u>	<u>TM Band</u>	<u>Wavelength, mm</u>
1	A	0.42 - 0.45
2	1	0.45 - 0.52
3	2	0.52 - 0.60
4	B	0.60 - 0.62
5	3	0.63 - 0.69
6	C	0.69 - 0.75
7	4	0.75 - 0.90

8	D	0.91 - 1.05
9	5	1.55 - 1.75
10	7	2.08 - 2.35
11	6	8.5 - 12.5 low gain
12	6	8.5 - 12.5 high gain

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Total Scan Angle:	86°
Pixels/Scan Line:	716
Scan Rate:	12.5/25/50/100 scans/second

### **Thermal Infrared Multispectral Scanner**

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2 *mm* to 12.2 *mm* region.

<u>Channel</u>	<u>Wavelength, <i>mm</i></u>	<u>NET</u>
1	8.2 - 8.6	< 0.3° C
2	8.6 - 9.0	< 0.3° C
3	9.0 - 9.4	< 0.3° C
4	9.4 - 10.2	< 0.3° C
5	10.2 - 11.2	< 0.3° C
6	11.2 - 12.2	< 0.3° C

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56°
Swath Width:	16.9 nmi (31.3 km) at 65,000 feet
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

Information on data tape format, logical record format, and scanner calibration data may be obtained from the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 650-604-6252).

TIMS FLIGHT DATA  
 FLIGHT NUMBER: 97-007-02

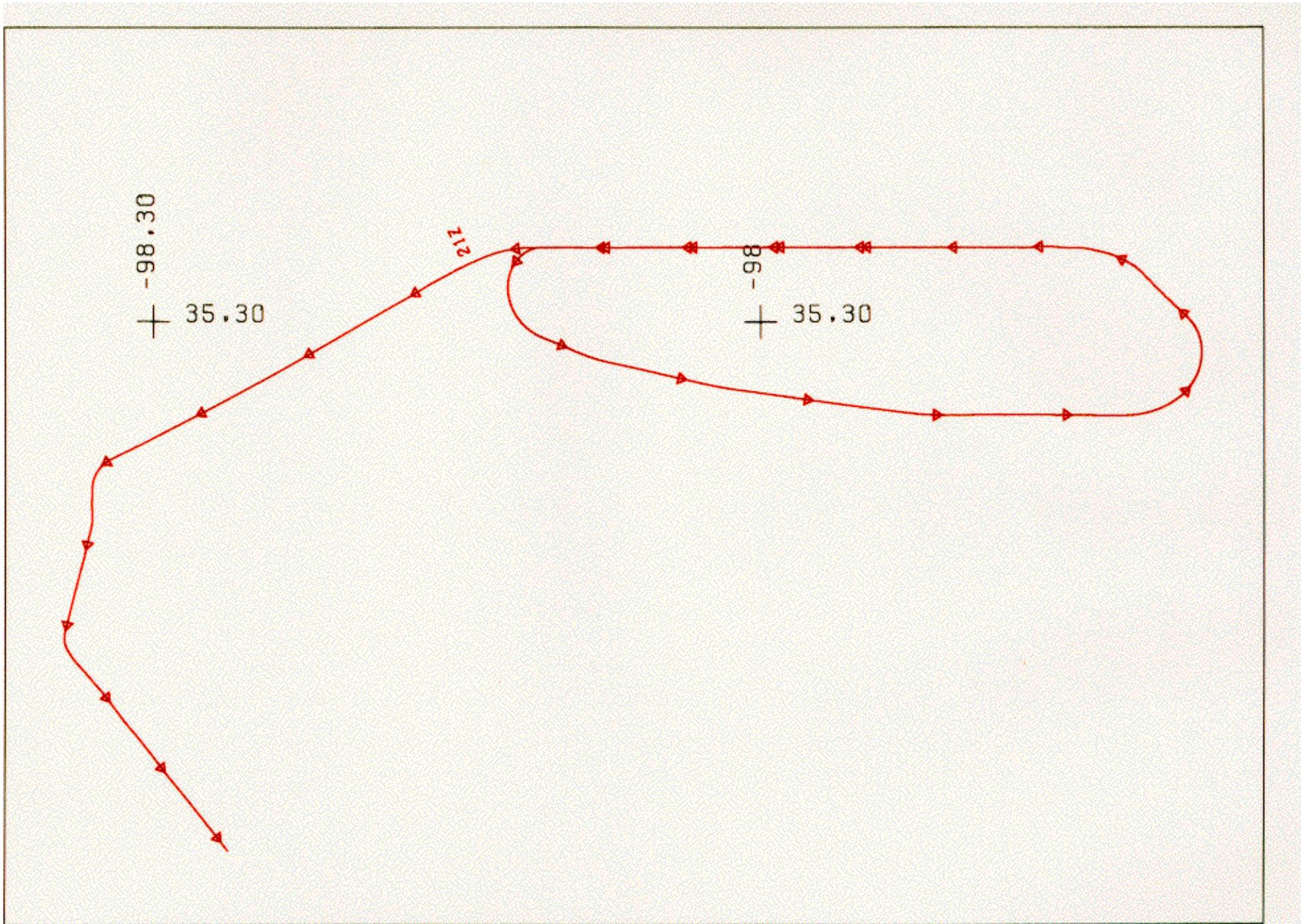
Site	Line	Run	Actual time (GMT)		Actual scanline		Altitude	Scan Speed	total Good	total Interpolated	total Repeated	
			begin	end	begin	end	feet/meter	(rps)	scanlines	scanlines	scanlines	
1.	746	1	1	20:03:38.0	20:07:26.0	58917	64581	16000/ 4877	25.00	5665	0	0
2.	746	1	2	20:19:12.0	20:23:24.0	82157	88426	16000/ 4877	25.00	6270	0	0
3.	748	1	1	20:40:11.0	20:44:20.0	113458	119654	16000/ 4877	25.00	6197	0	0
4.	748	1	2	20:54:52.0	20:59:08.0	135365	141748	16000/ 4877	25.00	6384	0	0
5.	747	1	1	21:06:18.0	21:08:30.0	152417	155700	16000/ 4877	25.00	3284	0	0

Notes: Site 746 CART-ARM Oklahoma  
 Site 748 El Reno Oklahoma  
 Site 747 Lake Cobb Oklahoma

DoE DAEDALUS TMS FLIGHT DATA  
 FLIGHT NUMBER: 97-007-02

Site	Line	Run	A c t u a l t i m e (GMT)		A c t u a l s c a n l i n e		Altitude feet/meter	Scan Speed (rps)	total G o o d scanlines	total Interpolated scanlines	total Repeated scanlines	
			b e g i n	e n d	b e g i n	e n d						
1.	746	1	1	20:03:38.0	20:07:25.6	29605	32450	16000/ 4877	12.50	2846	0	0
2.	746	1	2	20:19:13.2	20:23:24.0	41295	44430	16000/ 4877	12.50	3136	0	0
3.	748	1	1	20:40:11.0	20:44:19.0	57018	60118	16000/ 4877	12.50	3101	0	0
4.	748	1	2	20:54:41.3	20:59:10.4	67896	71260	16000/ 4877	12.50	3365	0	0
5.	747	1	1	21:06:17.4	21:08:27.4	76597	78222	16000/ 4877	12.50	1626	0	0

Notes: Site 746 CART-ARM Oklahoma  
 Site 748 El Reno Oklahoma  
 Site 747 Lake Cobb Oklahoma

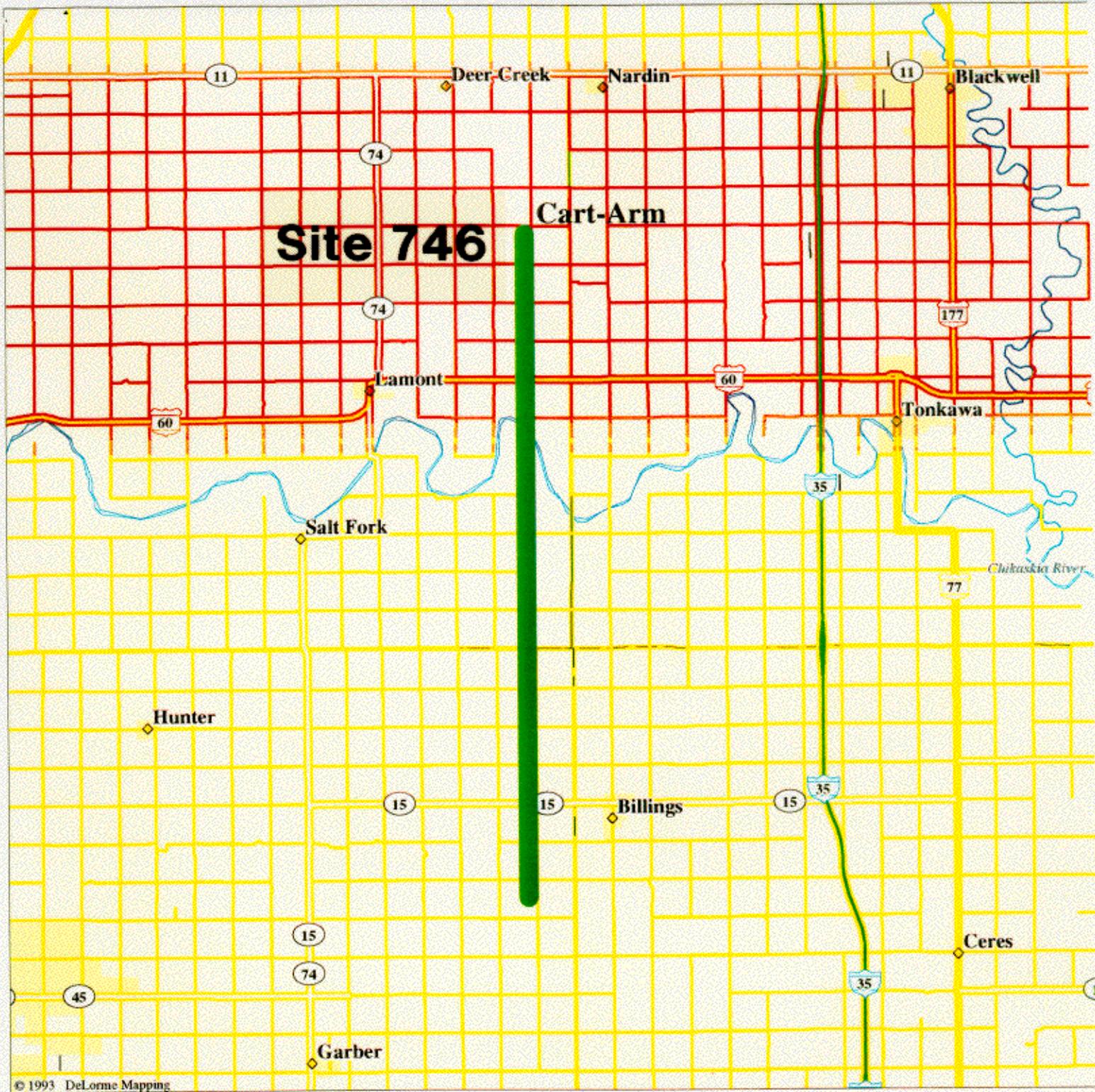


FLIGHT 97-007-02

30 JUNE 1997

R/C 799

TIMS / TMS



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LEGEND

-  State Route
-  Town, Small City
-  Interstate, Turnpike
-  US Highway
-  County Boundary
-  Population Center
-  Major Street/Road
-  Interstate Highway
-  State Route

-  US Highway
-  River
-  Airfield
-  Open Water

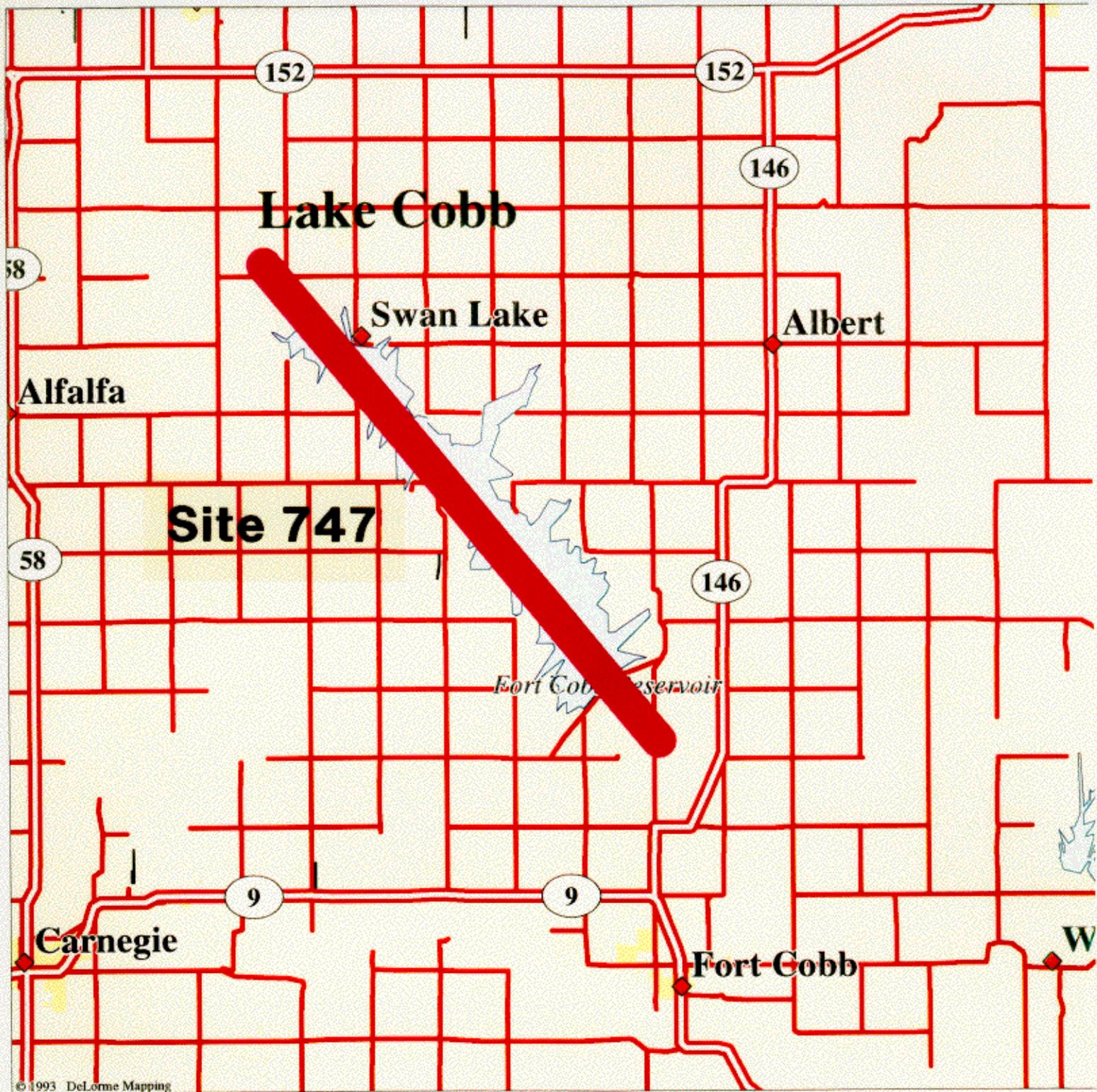
Scale 1:225,000 (at center)

5 Miles

5 KM

Mag 11.00

Fri Jun 27 15:38:57 1997



**LEGEND**

-  State Route
-  Geo Feature
-  Town, Small City
-  US Highway
-  County Boundary
-  Population Center
-  Major Street/Road
-  State Route
-  US Highway

-  Airfield
-  Open Water

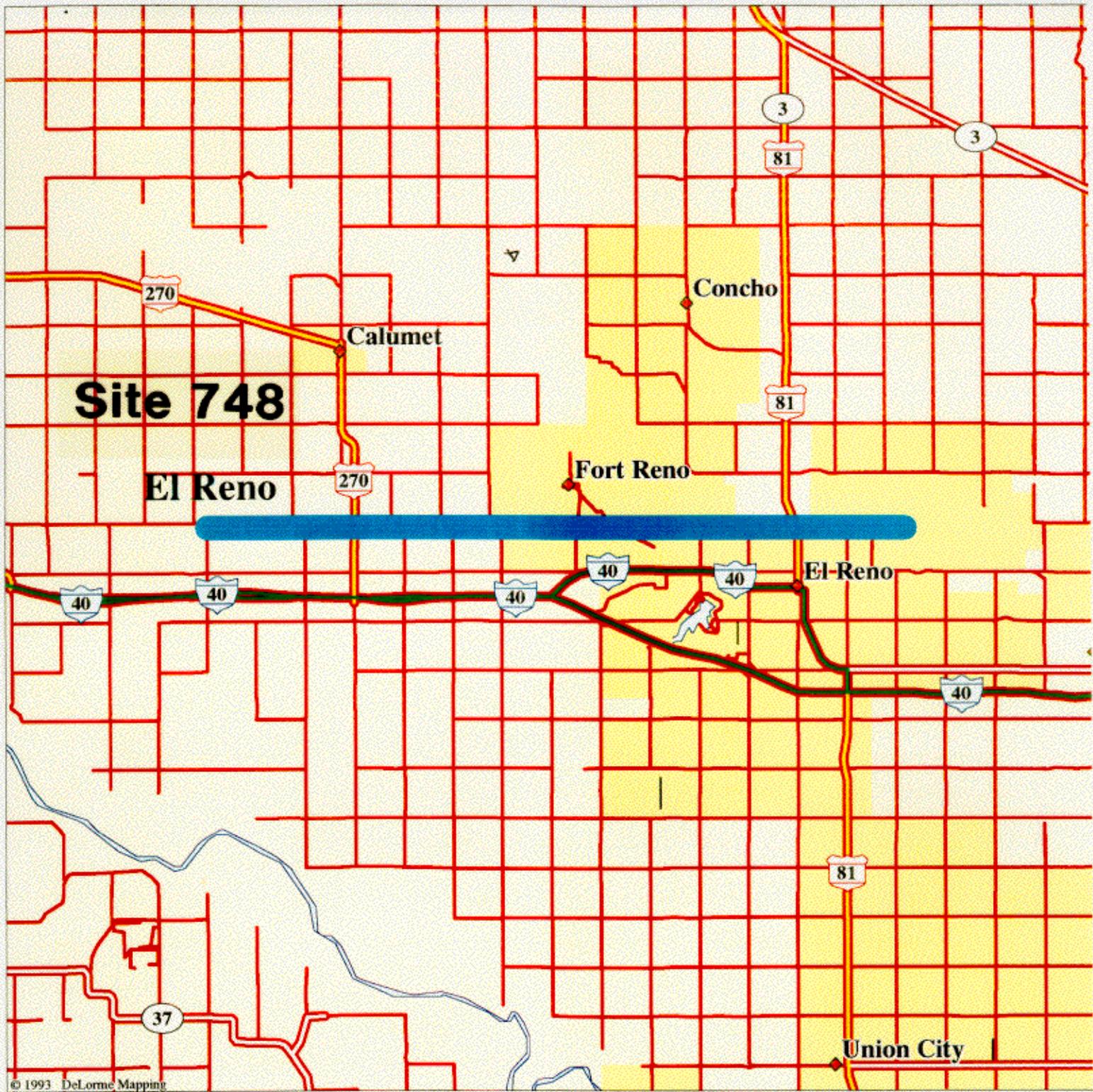
Scale 1:125,000 (at center)

 2 Miles

 2 KM

Mag 11.00

Fri Jun 27 15:45:15 1997



**LEGEND**

-  State Route
-  Town, Small City
-  Interstate, Turnpike
-  US Highway
-  County Boundary
-  Population Center
-  Major Street/Road
-  Interstate Highway
-  State Route

-  US Highway
-  River
-  Airfield
-  Open Water

Scale 1:175,000 (at center)

2 Miles

5 KM

Mag 11.00

Fri Jun 27 15:47:26 1997